which the Applicants regard as the invention. Applicants respectfully traverse this rejection and request reconsideration.

The Office asserts that the phrase, "the inorganic dielectric layer being highly selective relative to the barrier when etched" (emphasis supplied by the Examiner) in Applicants' independent claim 1 renders the claim indefinite. It is further asserted that it is not clear "what will be etched when etched" and that "highly selective relative to" is a relative term which renders the claim indefinite (paper No. 6, paragraph 3).

Highly selective is a term that is well known and understood in the art. Selectivity generally refers to the ability to perform a process or operation on, with, or to one material without impacting, damaging, or otherwise performing the same process or operation on, with, or to an adjacent, contiguous, or proximate material. In the technology of semiconductor manufacturing, selectivity refers to, by way of example, the ability to etch a layer of one material without etching an underlying layer of another material. For an example in the instant application, Applicants describe at page 2, line 18 – page 3, line 3, the use of un-doped TEOS oxide or fluorine doped oxide layers as providing excellent selectivities to layers of silicon nitride or silicon carbide.

In the cited phrase, Applicants have drafted the claim to identify the specific layers as the inorganic dielectric layer and the barrier layer, and the specific process is identified, but not claimed, as etching. The inorganic dielectric layer is identified as highly selective to another layer, the barrier layer. Therefore, the inorganic dielectric layer is highly selective to the barrier layer when the inorganic dielectric layer is etched. Applicants submit this is clearly recited in the claim, that the phrase is understood by one of ordinary skill in the art, and that the phrase does not render the claim indefinite.

Applicants further submit that the specification does identify standards for ascertaining the requisite degree, although one of ordinary skill in the art would appreciate the degree required to render the inorganic dielectric layer highly selective. The Examiner is kindly directed to page 2 of the specification as filed, lines 20-22 where excellent selectivities are identified as in a range of about 20:1. Additionally, a poor selectivity is identified on page 3, line 6, as nearing about 5:1. In describing embodiments of the present invention, Applicants recite at page 12, line 22 – page 13, line 1, that selectivities to the barrier layer 102 can range up to about 20:1 using the exemplary chemistry.

Paper No. 6 further submits that the phrase "when etched" is not a positively cited limitation and carries no patent weight. Applicants respectfully submit that "when

etched" is recited to clearly identify the process giving rise to the selectivity. Although etching might appear to be the obvious process giving rise to the selectivity in the context of claim 1, Applicants have deliberately identified the process. Applicants would further submit that etching, as a process step, is not a claimed limitation in claim 1. Examiner is directed to claims 2 and 3 in which a trench is formed using a first etch chemistry, and a via is formed using a second etch chemistry.

The Examiner additionally submits that the term "a low dielectric constant layer" is a relative term which renders the claim indefinite. Paper No. 6 states that the term "low dielectric constant" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Applicants respectfully traverse each characterization of the term "low dielectric constant," and request reconsideration.

The terms "low dielectric constant," and "low dielectric constant layer" are well known and understood by one of ordinary skill in the art. Low dielectric constant and now ultra-low dielectric constant have gained increasing importance in the field, and it would be difficult to consider one of ordinary skill in the art at the time of invention as failing to know, understand, and use the term. Applicants, however, have defined the term within the specification as filed. Examiner is directed to page 2, lines 7-8, where one example of a "lower dielectric material" is identified as having a dielectric constant of about 3.0 or lower. The Examiner is further directed to page 11, lines 8-16 where the Applicants have specifically recited the trench dielectric layer 106 is a low k ("k" or "K" used to denote dielectric constant) dielectric layer with a dielectric constant of below about 3, with a specific example of C-oxide as being low k, having a dielectric constant of about 3.0 or lower. Therefore, Applicants respectfully submit that, in addition to being known and understood by one of ordinary skill in the art, the Applicants have defined the term "low k dielectric," which is also known as a low dielectric constant, as about 3.0 or lower.

Claims 2, 6-7, 10, 13, and 14 were rejected for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention citing the asserted indefinite quality of the term "low dielectric constant layer." Applicants respectfully submit the term is well known in addition to being described in the specification as filed, and re-submits the argument set forth above. No specific rejection of claims 3-5, 8-9, 11-12, 15-16, and 26, was recited. Applicants assume the rejection

stems from the previously recited rejection as applied to independent claims 1 and 10 from which the other claims ultimately depend.

For at least the above reasons, Applicants respectfully submit that the term "low dielectric constant layer" is defined in the specification as well as being known and understood by one of ordinary skill in the art. Applicants further point out that the term "low dielectric constant" is also denoted as "low k dielectric" in the specification. Applicants respectfully request reconsideration of the §112 rejections.

Rejections under 35 U.S.C. §102

Claims 1-3, 7-8, 10, and 14 were rejected under 35 U.S.C. §102(e) as being anticipated by Jain (U.S. Patent No. 5,821,168). This rejection is respectfully traversed. It is noted that the rejection is based on the scope of using "a low dielectric constant layer" as a *name* of dielectric layer to define a trench. As described above in detail, a low dielectric constant layer defines a quality or characteristic of the dielectric, and is more than a mere *name* of a dielectric layer.

Jain teaches a structure that includes four discrete insulating films (Col. 3, lines 3-4, Figure 3). The lower or first film is a barrier layer 48 made of plasma enhanced nitride. This barrier layer 48 is covered with a second film which is an oxide layer 26. The oxide layer 26 is covered by a third film which is an optional etch stop layer made of silicon oxynitride 50. The silicon oxynitride 50 layer has a thickness in the range of 200-700 Angstroms (Col. 3, lines 13-15). The fourth film is another oxide layer 54.

Jain teaches that the second and fourth films, the oxide layers, can be formed using tetraethylorthosilicate (TEOS), silicon oxyfluoride, low k dielectrics, or the like (Col 3, lines 15-17). Jain teaches two low dielectric constant layers.

In pending independent claims 1 and 10, Applicants are claiming a low dielectric constant trench layer over an inorganic dielectric via layer (specified as a silicon dioxide layer in independent claim 10). Thus, Applicants specifically claim at least a low dielectric constant layer over an inorganic dielectric layer, and the low dielectric constant layer is a trench layer and the inorganic dielectric layer is a via layer. Jain, on the other hand, teaches a low dielectric constant trench layer over a low dielectric constant via layer.

Jain, therefore, fails to teach each and every element of Applicants' independent claims 1 and 10. Applicants respectfully request that the Section 102 rejection be withdrawn. The dependent claims depending directly or indirectly from independent

claims 1 and 10 are submitted to be patentable over the cited reference for at least the same reasons.

Applicants further note that the Examiner identified claims 2-3 and 14 as not showing (claiming) difference between the first etch chemistry and the second etch chemistry, and that they were rejected under a broad scope that the first etch chemistry and the second etch chemistry are chosen in the same parameter conditions. Applicants have herein submitted amended claims 3 and 14 reciting that the second etch chemistry is different than the first etch chemistry, and have noted the Applicants' specification as filed, page 11, line 22 – page 12, line 22 for support of the claim amendments.

Claims 1-5, 10-14 and 26 were rejected under 35 U.S.C. §102(e) as being anticipated by Smith (U.S. Patent No. 6,277,733). It is noted that the rejection is based on the scope of using "a low dielectric constant layer" as a ***name*** of dielectric layer to define a trench. As described above in detail, a low dielectric constant layer defines a quality or characteristic of the dielectric, and is more than a mere ***name*** of a dielectric layer.

Smith teaches an electronic device and methods for fabricating the same on a semiconductor wafer. While Smith teaches a plurality of layers to the disclosed device, of particular relevance to the presently claimed invention is a via layer, identified in the Smith reference as 424, and a trench layer, identified in the Smith reference as 430. As noted in the Smith reference at col. 3, lines 26-28, "dielectric layer 424 (preferably comprised of FSG, BPSG, PSG, TEOS, aerogel, xerogel, HSQ ***or any other low dielectric constant material***" is a low dielectric constant layer. The reference states at col. 3, lines 55-59, that "dielectric layer 430 is comprised of TEOS, FSG, PBSG, PSG, HSQ, or a low dielectric constant material, such as aerogel, xerogel, or a polymer (such as fluorinated parylene)." Dielectric layer 430 therefore can be fabricated of the named materials, *or* a low dielectric constant, *or* a polymer. Smith, therefore, teaches a trench layer which can be of a number of materials including a low dielectric constant material, over a via layer of a low dielectric constant material.

The present invention claims a low dielectric constant trench layer over an inorganic dielectric via layer. The reference teaches a low dielectric constant (among other materials) trench layer over a low dielectric constant via layer. The reference does not teach each and every feature of Applicants' independent claims 1 and 10. Applicants respectfully request that the Section 102 rejection be withdrawn. The dependent claims

depending directly or indirectly from independent claims 1 and 10 are submitted to be patentable over the cited reference for at least the same reasons.

Applicants again note as above, that the Examiner identified claims 2-3 and 14 as not showing (claiming) difference between the first etch chemistry and the second etch chemistry, and that they were rejected under a broad scope that the first etch chemistry and the second etch chemistry are chosen in the same parameter conditions. Applicants have herein submitted amended claims 3 and 14 reciting that the second etch chemistry is different than the first etch chemistry, and have noted the Applicants' specification as filed, page 11, line 22 – page 12, line 22 for support of the claim amendments.

Claims 1-4 and 10-16 were rejected under 35 U.S.C. §102(e) as being anticipated by Wang et al. (U.S. Patent No. 6,255,735, hereinafter Wang '735). Applicants traverse this rejection. It is noted that the rejection is based on the scope of using "a low dielectric constant layer" as a *name* of dielectric layer to define a trench. As described above in detail, a low dielectric constant layer defines a quality or characteristic of the dielectric, and is more than a mere *name* of a dielectric layer.

Wang '735 teach a structure similar to Smith and Jain which includes a low k dielectric trench layer over a low k dielectric constant via layer. Wang '735 does not teach a low k dielectric trench layer over an inorganic dielectric via layer. Wang '735 therefore does not teach each and every feature of the claimed invention. Applicants respectfully request this rejection be withdrawn.

Applicants further note, as above, that the Examiner identified claims 2-3 and 14 as not showing (claiming) difference between the first etch chemistry and the second etch chemistry, and that they were rejected under a broad scope that the first etch chemistry and the second etch chemistry are chosen in the same parameter conditions. Applicants have herein submitted amended claims 3 and 14 reciting that the second etch chemistry is different than the first etch chemistry, and have noted the Applicants' specification as filed, page 11, line 22 – page 12, line 22 for support of the claim amendments.

Claims 1-4 and 10-16 were rejected under 35 U.S.C. §102(e) as being anticipated by Wang et al. (U.S. Patent No. 6,207,577, hereinafter Wang '577). Applicants traverse this rejection. It is noted that the rejection is based on the scope of using "a low dielectric constant layer" as a *name* of dielectric layer to define a trench. As described above in detail, a low dielectric constant layer defines a quality or characteristic of the dielectric, and is more than a mere *name* of a dielectric layer.

Wang '577 teaches a similar structure to Wang '735, in that Wang '577 teaches a low dielectric constant trench layer over an oxide via layer. Wang '577 does not teach a low dielectric constant trench layer over an inorganic dielectric via layer. Wang '577, therefore, does not teach each and every feature of Applicants' claimed invention, and Applicants request the §102 rejection be withdrawn.

Applicants once again note, as above, that the Examiner identified claims 2-3 and 14 as not showing (claiming) difference between the first etch chemistry and the second etch chemistry, and that they were rejected under a broad scope that the first etch chemistry and the second etch chemistry are chosen in the same parameter conditions. Applicants have herein submitted amended claims 3 and 14 reciting that the second etch chemistry is different than the first etch chemistry, and have noted the Applicants' specification as filed, page 11, line 22 – page 12, line 22 for support of the claim amendments.

Rejections under 35 U.S.C. § 103

Claims 4-9, 15-16, and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over Jain, Smith, Wang '735, and Wang '577 as applied to claims 1 or 10 above, in further view of Usami (U.S. Patent No. 6,077,574). Applicants respectfully traverse this rejection.

If Applicants correctly understand the rejection, the Office is rejecting only dependent claims 4-9, 15-16, and 26 under §103, and on the basis of independent claims 1 and 10 having been rejected under §102 over the cited references as discussed above. Therefore, no §103 rejection has issued against independent claims 1 and 10. As Applicants have argued above in detail, the cited references fail to teach each and every feature of Applicants' independent claims 1 and 10, and Applicants' independent claims 1 and 10 are patentable over the cited art under §102. Independent claims 1 and 10 do not stand rejected under §103, and are therefore patentable under §103 over the cited art. Applicant therefore submits that dependent claims 4-9, 15-16, and 26, each of which depends ultimately from one of independent claims 1 and 10, are likewise patentable over the cited art under §103, and Applicants respectfully request the §103 rejections be withdrawn.

In view of the foregoing, Applicants respectfully request reconsideration of claims 1-15 and 26, and submit that these claims are in condition for allowance. Accordingly, a Notice of Allowance is respectfully requested. If Examiner has any

questions concerning the present Amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900, ext. 6905. If any additional fees are due in connection with filing this amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. LAM1P106A). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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MARKED UP CLAIMS

The claims are herein amended as indicated.

3. (Amended) A method for making a dielectric structure for dual-damascene applications as recited in claim 2, further comprising:

forming a via in the inorganic dielectric layer using a second etch chemistry, the second etch chemistry being different than the first etch chemistry and the via being within the trench.

14. (Amended) A method for making a multi-layer inter-metal dielectric over a substrate as recited in claim 10, wherein forming the via in the trench extending to the barrier layer further includes,

implementing a first chemistry optimized to etch through the low dielectric constant layer; and

implementing a second chemistry which is different than the first etch chemistry and is optimized to etch through the silicon dioxide layer.